

ATTACHMENT - REMARKS

By this Amendment, independent claims 1 and 21 have been amended to better define the invention. Other dependent claims have also been amended consistent with the changes to independent claims 1 or 21 and/or for clarity. In addition, dependent claims 4, 11 and 25 have been canceled; while new independent claims 28 and 29 have been added. It is submitted that the present application is in condition for allowance for the following reasons.

DEFINITION OF "LAND"

Initially, it will be appreciated that the term "land" is well known to those of ordinary skill in the art reading this application, and that the term "land" is the name given to those parts of the bore cutting tool which are on the peripheral edge of the tool. For example, in the case of a twist drill, the skilled reader knows that the land is the peripheral portion of the body between adjacent flutes. In a twist drill the land includes the *margin and body diameter clearance*. The *margin* (also known as the cylindrical land) is the cylindrical portion of the land which is not cut away to provide the body diameter clearance. The body diameter clearance is the bit that has been cut away to provide a 'step' behind the margin. The margin is therefore at the leading edge of the land and the body diameter clearance extends behind the margin, in the sense that it follows behind the margin when the drill is rotating.

Thus, reference to a "land" in independent claims 1 and 21 is a reference to the peripheral portion of the body of the bore cutting tool, which in the case of a twist drill includes the margin (cylindrical land) **and** body diameter clearance.

Further, in view of the amendments to independent claims 1 and 21, it is therefore now a requirement in claims 1 and 21 that **both** the margin (cylindrical land) **and** the body diameter clearance are uncoated.

NOVELTY

Independent claim 1 has now been amended to include the subject matters of canceled dependent claims 4 and 11 (part), and thus now requires (emphasis added):

a bore cutting tool having
a cutting edge,
a rake face extending from one side of the cutting edge,
a non-cutting back face extending from the opposite side of the cutting edge to the rake face, and
a land,
wherein the **rake face is at least partially coated, but the land and at least part of the back face are not coated.**

Independent claim 21 has now been similarly amended to include the subject matter of canceled dependent claim 4, and thus now requires (emphasis added):

a method of partially coating a bore cutting tool, the tool having a cutting edge, a rake face extending from one side of the cutting edge, a non-cutting back face extending from the opposite side of the cutting edge to the rake face, and a land, wherein the method includes the step of
at least partially coating the rake face but not coating the land and at least part of the back face.

None of the prior art cited by the Examiner discloses the features of independent claims 1 and 21 (and new independent claims 28 and 29 as noted hereafter). In particular, none of this art discloses a bore cutting tool where the **land is not coated**. The skilled reader understands "land" to be the margin and body clearance diameter, as explained above.

Section 3 – § 102 Rejection of Independent Claims 1 and 21 and Dependent Claims 3-5, 7-14, 19-20 and 22 Over JP 07-60521 (OSAKA)

Since the independent claims have been amended as noted above, this rejection is no longer relevant as now additionally noted below.

Referring to Figure 1A and 2 of OSAKA, it is clear that the **margin 6 is coated**. The skilled reader understands, as discussed above, that the margin forms part of the land. Therefore, the drill of OSAKA does not disclose "the **land** and at least part of the back face are **not coated**", as required by amended independent claim 1. Claim 1 is therefore novel with respect to OSAKA. Accordingly, dependent claims 3, 5, 7-10, 12-14 and 19-20 are also novel with respect to OSAKA, since they incorporate the features of claim 1.

It also follows that the drill of OSAKA cannot have been partially coated using a method that "includes the step of at least partially coating the rake face and **not coating the land** and at least part of the back face", as required by amended independent claim 21. Claim 21 is therefore novel with respect to OSAKA. Accordingly, it follows that dependent claims 22 and 27 are also novel with respect to OSAKA, since they incorporate the features of claim 21.

Section 4 – § 102 Rejection of Independent Claims 1 and 21 and Dependent Claims 3-5, 7-11, 13-14, 19-20, 22, 25 and 27 Over JP 57-184616 (FUJIKOSHI)

Since the independent claims have been amended as noted above, this rejection is no longer relevant as now additionally noted below.

Referring to Figures 4, 5 and 6 of FUJIKOSHI, it is clear that that a coating is applied to the entire surface of the drill except for the major flank 2 and the margin 3. **The body diameter clearance is therefore coated** (see Fig. 4 in particular). The skilled reader understands, as discussed above, that the term "land" includes the body diameter clearance. Therefore, the drill of FUJIKOSHI does not disclose "the **land** and at least part of the back face are **not coated**", as required by amended claim 1. Claim 1 is therefore novel with respect to FUJIKOSHI. Accordingly, dependent claims 3, 5, 7-10, 13-14 and 19-20 are also novel with respect to FUJIKOSHI, since they incorporate the features of claim 1.

It also follows that the drill of FUJIKOSHI cannot have been partially coated using a method that "includes the step of at least partially coating the rake face and **not coating the land** and at least part of the back face", as required by amended independent claim 21. Claim 21 is therefore novel with respect to FUJIKOSHI. Accordingly, dependent claims 22 and 27 are also novel with respect to FUJIKOSHI, since they incorporate the features of claim 21.

Section 5 – § 102 Rejection of Independent Claims 1 and 21 and Dependent Claims 2-11, 13-15, 19, 22, 26 and 27 Over JP 2000-52119 (OHASHI)

Since the independent claims have been amended as noted above, this rejection is no longer relevant as now additionally noted below.

The abstract of OHASHI states that the "drill surface from a cutting edge 6 to a part of a groove portion 2 and a shank portion 1 is coated". The skilled reader, with reference to Figures 1a and 1b, would have no doubt that this means completely

coating all of the surfaces (including margin 4 and body diameter clearance 5) from the cutting edge 6 at the tip of the drill to a point part way down the grooved portion 2 of the drill body. Therefore, the drill of OHASHI does not disclose "the **land** and at least part of the back face are **not coated**", as required by amended claim 1. Claim 1 is therefore novel with respect to OHASHI. Accordingly, dependent claims 23, 5-10, 13-15 and 19 are also novel with respect to OHASHI, since they incorporate the features of claim 1.

It also follows that the drill of OHASHI cannot have been partially coated using a method that "includes the step of at least partially coating the rake face and not coating at least part of the back face and **not coating the land**", as required by amended claim 21. Claim 21 is therefore novel with respect to OHASHI. Accordingly, dependent claims 22, 26 and 27 are also novel with respect to OHASHI, since they incorporate the features of claim 21.

Section 6 – § 102 Rejection of Independent Claims 1 and 21 and Dependent Claims 2-5, 7-10, 14-15, 19-20, 22-24 and 27 Over JP 56-3117 (NEGISHI)

Since the independent claims have been amended as noted above, this rejection is no longer relevant as now additionally noted below.

As the Examiner has noted, Figures 6a and 6b of NEGISHI clearly show that the land is coated. Therefore, the drill of NEGISHI does not disclose "the **land** and at least part of the back face are **not coated**", as required by amended claim 1. Claim 1 is therefore novel with respect to NEGISHI. Accordingly, dependent claims 2-3, 5, 7-10, 14-15 and 19-20 are also novel with respect to NEGISHI, since they incorporate the features of claim 1.

It also follows that the drill of NEGISHI cannot have been partially coated using a method that "includes the step of at least partially coating the rake face and not coating at least part of the back face and **not coating the land**", as required by amended claim 21. Claim 21 is therefore novel with respect to NEGISHI. Accordingly, dependent claims 22-24 and 27 are also novel with respect to NEGISHI, since they incorporate the features of claim 21.

OBVIOUSNESS (§ 102 REFERENCES)

As discussed in the specification, the present inventors have established for the first time that TiN particles transfer from TiN coated drills to work pieces (see page 4, lines 11-12 and 26-27 of the application as filed). It is also established that such TiN particles may be disadvantageous.

The present inventors also discovered that the surfaces of the bore cutting tool that come into contact with the work piece but do not cut into the work piece, may be responsible for a significant amount of particle transfer from the tool to the work piece (see page 9, line 27 to page 10, line 8). The land and back face are the two non-cutting surfaces which have been identified as being particularly responsible for particle transfer (see page 6, lines 10 to 13 and 30 to 31). The present inventors have also discovered that the performance and wear resistance of the bore cutting tool can be maintained with a partial rather than complete coating, provided that at least part of the rake face is coated (see page 6, lines 22 to 28; page 7, lines 18 to 29; and page 9, lines 19 to 25).

Accordingly, amended independent claim 1 defines those features which lead to the advantages described in the specification: a **partially coated rake face** (to ensure good wear resistance), and a **land that is not coated** and a back face that is at **least partially uncoated** (to reduce the transfer of particles from the tool to the work piece).

Whilst partial coating of twist drills is known from the prior art, the underlying technical reasons for applying the **specific pattern** of partial coating defined in new claim 1 are not known from any of the cited prior art documents. Specifically, there is no disclosure in any of the documents cited by the Examiner that the problem of particulate transfer from cutting tool to work piece is even appreciated, let alone that the mechanism for such transfer is understood. The skilled reader therefore has no motivation or incentive to combine any of the partial coating arrangements of the prior art.

The prior art documents cited by the examiner generally teach towards coating the tip of a drill or the section from the point of contact with the work piece to the drill shank. Where partial coating is applied, it is never not applied to the land, and in fact, in the drill designs of the prior art the coating of at least part of the land is **essential** for their function. There is therefore nothing that would lead the skilled reader to adopt the specific pattern of coating required by amended independent claim 1, and the corresponding method of doing so of amended independent claim 21. This is no surprise because there is no disclosure in any of the cited prior art documents of the problem of particle transfer, let alone the problem of minimizing particle transfer whilst maintaining drilling efficiency, and the skilled reader therefore has no motivation to adopt the specific coating pattern as defined in amended claims 1 or 21.

Therefore, not only are independent claims 1 and 21 not anticipated by the above noted references as discussed above, it is further submitted that the limitations of these claims are also not made obvious by these references.

Section 8 – § 103 Rejection of Dependent Claims 17-18 Over JP 56-3117 (NEGISHI)

Since independent claim 1 has been amended as noted above to be allowable, dependent claims 17 and 18 are likewise allowable for the same reasons as claim 1 by virtue of their dependency from claim 1.

Section 9 – § 103 Rejection of Dependent Claims 17-18 Over JP 07-60521 (OSAKA)

Since independent claim 1 has been amended as noted above to be allowable, dependent claims 17 and 18 are likewise allowable for the same reasons as claim 1 by virtue of their dependency from claim 1.

Section 10 – § 103 Rejection of Dependent Claims 14-16 Over JP 56-3117 (NEGISHI)
in view of USP 6315504 (SEKIGUCHI)

Since independent claim 1 has been amended as noted above to be allowable, dependent claims 14-16 are likewise allowable for the same reasons as claim 1 by virtue of their dependency from claim 1. In addition, the following will be noted.

SEKIGUCHI does not add any relevant teaching to NEGISHI in respect of the features of claim 1. SEKIGUCHI discloses a drill where "at least on the tip end portion of the twist drill, is coated with a Ti-based hard material film comprising at least one layer of TiN, TiC, TiCN, TiAlN or TiAlNC to further reduce wear or chippings on its major

cutting edges and on its leading edges of the lands" [col. 2, lines 58-62 of SEKIGUCHI]. The skilled reader understands this to mean that the whole tip is coated with a Ti-based hard material film including the "leading edges of the land". SEKIGUCHI therefore teaches the skilled reader to coat the land, because the whole tip coating would be seen as an essential feature for wear performance. As such, claim 1 and hence claims 14-16 are not obvious in light of SEKIGUCHI alone or in combination with NEGISHI.

Section 11 - § 103 Rejection of Dependent Claim 26 Over JP 07-60521 (OSAKA) or JP 56-3117 (NEGISHI) in view of US 6923602 (OSAWA)

Since independent claim 21 has been amended as noted above to be allowable, dependent claim 26 is likewise allowable for the same reasons as claim 21 by virtue of its dependency from claim 21. In addition, the following will be noted.

Irrespective of whether or not PVD is disclosed in OSAWA, none of OSAKA, NEGISHI or OSAWA disclose a drill where the land is not coated, nor provide any teaching whatsoever that not coating the land is advantageous. In fact the teaching in OSAKA and NEGISHI is to coat the land, as discussed above. In addition, the teaching of OSAWA that PVD is a method of coating does not represent a teaching not to coat the land. Furthermore, the overwhelming technical teaching of OSAWA is concerned with particular **geometries**, not coatings. As such, claim 21 and hence claim 26 are not obvious in the light of OSAKA and/or NEGISHI in view of OSAWA.

Section 12 - § 103 Rejection of Dependent Claims 3 & 25 Over JP 07-60521 (OSAKA) or JP 56-3117 (NEGISHI) in view of US 4728231 (KUNIMORI)

Since independent claim 1 has been amended as noted above to be allowable, dependent claim 3 is likewise allowable for the same reasons as claim 1 by virtue of its dependency from claim 1. Dependent claim 25 has been deleted, so the rejection thereof is no longer relevant. In addition, the following will be noted.

As discussed above, OSAKA **requires** that the margin is coated and NEGISHI similarly discloses coating of the land. There is nothing in KUNIMORI that would motivate the skilled reader to go against this clear teaching of OSAKA and NEGISHI. KUNIMORI is concerned only with addressing specific problems relating to cross-break strength and chip ejecting ability (see column 1, lines 18 – 41 and column 2, lines 26-32), not the coating of a drill.

It is noted that the Examiner suggests that when coated tip 9 is attached to uncoated body 4, the drill has a partially coated back face/clearance face. However, if this is correct, full coating of the tip, as required in KUNIMORI, results in a drill having part of the land coated – with reference to Figure 4 and the top portion of Figure 1, at least some of the coated outer surface of tip 9 becomes the land when the tip is inserted into the groove of the main body. Therefore the teaching of KUNIMORI is to coat part of the land, contrary to what is claimed in independent claim 1.

In conclusion, there is no teaching in NEGISHI, OSAKA or KUNIMORI to coat the rake face but **not the land**. Therefore this combination of documents would not motivate the skilled reader to arrive at the combination of features of independent claim 1 and hence claim 3 dependent therefrom, so claims 1 and 3 are not obvious in view of these documents.

New Independent Claims 28 and 29

New Independent claims 28 and 29 contain the features of amended independent claims 1 and 21, respectively, combined with features of dependent claims 15-17. Therefore, for the same reasons as explained above for claims 1 and 21, it is submitted that independent claims 28 and 29 are both novel and inventive as well.

For all of the foregoing reasons, it is submitted that the present application is in condition for allowance and such action is solicited.

Respectfully submitted,

Date: April 15, 2010

Signed By /Douglas E. Jackson/
Attorney of Record Name: Douglas E. Jackson
Registration No.: 28,518

STITES & HARBISON PLLC ♦ 1199 North Fairfax St. ♦ Suite 900 ♦ Alexandria, VA 22314
TEL: 703-739-4900 ♦ FAX: 703-739-9577 ♦ CUSTOMER NO. 881